Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

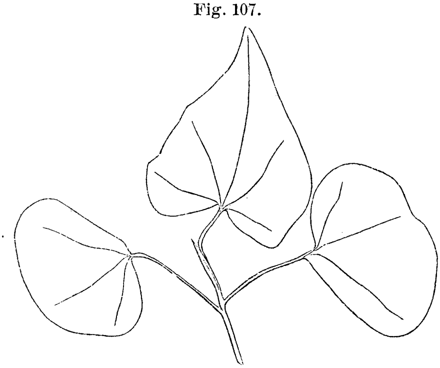
JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

in the same manner by a flower. Thus we have four leaves in two pairs closely sitting about a flower. As thus arranged spreading each way they are all fuller at the base on the side next the flower, where there is least light and least room. This is contrary to what we should expect according to De Candolle and Spencer. An examination of the plant for a moment will make it clear.

Every botanist is familiar with the unsymmetrical petals on the sides of the pea flower, violet, lobes of mint blossom, and those of other plants.

The strangest thing under *want of symmetry* that I have seen in plants, is found in the cotyledons of our cultivated buckwheat. While in the seed, they are pressed together, and rolled up from one edge. When the cotyledons have acquired their full growth, they have petioles about half an inch long; *each* cotyledon is fullest on its *left* side, so they would not match each other without turning one of them over. Perhaps this is a puzzle analogous to homologizing the hand and foot on the same side of the body. All our theories so far read or imagined, such as influence of heat, light, gravitation, number of ranks on the stem, length of petiole, pressure, natural selection, do not satisfactorily explain all these peculiarities.

Fig. 107.



Cotyledons of *Fagopyrum esculentum*, Buckwheat, each fullest on right lobe.

So far, we agree with Dr. Wilder, "That such peculiarities are true and original characteristics of the plants, and that they are produced by the so-called vital force acting in a definite way."

On the Oil Wells of Terre Haute, Indiana.—By Dr. T. Sterry Hunt.

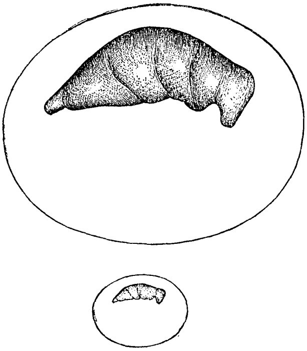
In previous publications, I have endeavored to show that the source of the petroleum in southwestern Ontario, and probably in some other localities, is to be sought in the oleiferous limestones of the Corniferous and Niagara formations, both of which abound in indigenous petroleum. I have, moreover, expressed the opinion that the overlying sandstones of Pennsylvania are also truly oleiferous. In a paper read to this Association last year, I showed that the Niagara limestone at Chicago holds imprisoned in its pores an enormous quantity of oil, and remarked that the reservoirs which supply the wells in other districts are fissures along anticlinals, which fissures, though sometimes occurring in strata above the oil-bearing horizon, in Ontario frequently occur in the Corniferous limestone itself. Hence the view held by some that the source of the oil in that region is to be sought in the overlying strata, is negatived. In Ontario, there intervenes between the Corniferous and Niagara formations the great saliferous series known as the Onondaga or Salina formation. This, however, is wanting to the westward, where the first two formations come together, and, according to Prof. Cox, where exposed at North Vernon, Indiana, are both oleiferous.

A well lately sunk at Terre Haute, Indiana, in search of fresh water has shown the existence of a productive source of oil in that region. It was carried nineteen hundred feet, and yields about two barrels of oil daily. A second well, a quarter of a mile east of north from the first, now gives a supply of twenty-five barrels of oil daily. After passing through one hundred and fifty feet of superficial sand and gravel, the boring was carried to a depth of sixteen hundred and twenty-five feet, where oil was struck. According to Prof. Cox, the strata passed through are as follows: Coal measures, seven hundred feet; Carboniferous limestones with underlying sandstones and shales, seven hundred feet; black pyroschists regarded as the equivalent of the Genessee slates, fifty feet. Beneath, at a depth of twenty-five feet in the underlying Corniferous limestone, the oil-vein was met with. The oil in the first well was found at the same horizon. A third well about a mile to the westward, was carried to two thousand feet, but only traces of oil were found. This locality, on the Wabash river is, according to Prof. Cox, on the line of a gentle anticlinal or uplift, which is traced a long distance to the west of south. This relation of productive oil-wells to such anticlinals was pointed out by Prof. Andrews and by myself in 1861.

THE DEVELOPMENT OF AMBLYSTOMA LURIDA SAGER.—BY DR. P. R. HOY.

THIS, the largest of the North American salamanders, affords superior facilities for studying the habits and embryonic changes from the egg to the perfected reptile. The adult female of this species is from eleven to twelve inches in length. The male is rather less. They excavate holes in the ground in which they conceal their bodies, the head only being visible. Thus they lie in wait for stray slugs and insects on which they subsist. Late in the fall they stray about seeking a hiding place in which to hibernate, at which time they frequently find their way into cellars to the great consternation of the household.

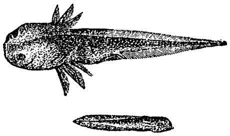
Fig. 108.



Egg of *Amblystoma*, at 13th day Lower figure of natural size.

Early in the spring they repair to neighboring ponds, in which to deposit their eggs, which they place in packets of from twenty to fifty on blades of coarse grass. The eggs are one half inch in diameter, the albumen has considerable firmness, the yolk is one eighth of an inch in diameter, color, greenish olive, paler beneath. I will here omit reciting the development of the embryo previous to the escape of the tadpole from the egg, as there is no essential difference between the development within the egg of the salamander and that of the fish which has been so repeatedly studied with great care and the results recorded with minute exactness.

Fig. 109.



Young of *Amblystoma*, 10th day from the egg. Lower figure of natural size at time of escaping from egg.

The tadpole of this salamander emerges from the egg in twenty-five days. April 25, length one-half inch, color olive, eye spots visible, two short holders, gills rudimentary. May 5, tenth day, eyes developed, irids golden, color greyish olive, with three faint, transverse bands of a darker hue, gills plumed, no holders, fore legs starting; is now active, and feeds voraciously on aquatic insects. May 25, thirty days from the egg, fore feet tridactylous, consisting of thumb, forefinger, which is greatly elongated, and middle finger a little longer than the thumb. If there should be an arrest of development at this stage, the track would be bird-like. Next, the fourth finger makes its appearance, and, on the hind feet, the fifth comes still later. What is especially interesting is that when the legs or feet have been amputated, which frequently occurs, the operation being performed by those miniature fresh water sharks, the larvæ of dragon flies and water beetles, the development of the toes is precisely in the same order, first the three toes, then the fourth, and on the hind feet the fifth. The gills are now beautifully plumed and when closed reach to the centre of the entire animal; hind legs starting. June 20, fifty-six days, hind feet developed.

As the lungs increase the gills wither and are gradually absorbed, so that by the middle of August the gills have all disappeared. The time consumed in the wonderful process is a little over one hundred days.

OBSERVATIONS ON THE SYSTEMATIC RELATIONS OF THE FISHES.—BY PROF. EDWARD D. COPE.

I. PRELIMINARY.

THE system of fishes as at present adopted in this country, is the result of the labors of many naturalists, but chiefly of Cuvier, Agassiz, Müller and Gill. Without going into the history of the subject at present, it will be proper to point out the principal modifications of Cuvier's system, introduced by his three successors. The orders of Cuvier were the *Chondropterygii*, *Malacopterygii*, *Acanthopterygii*, *Plectognathi* and *Lophobranchii*.

Professor Agassiz, under the name of *Placoids*, adopted the first division; the second he called the *Cycloids*, the third *Ctenoids*, and then created a fourth order under the name of *Ganoids*, which should embrace a portion of Cuvier's *Chondropterygii* (the sturgeons), a portion of the *Malacopterygii Abdominales* (the bony gars, etc.), and the two last orders of Cuvier. Professor Müller following, with a still more complete anatomical investigation, especially into the soft parts, discerned three *sub-classes* in Cuvier's *Chondrostomi*, which he named the *Leptocardii* (lancelet), *Dermopteri* (lamprey, etc.), and the *Selachii* (sharks, etc.). In the then recently discovered Lepidosiren he saw a fourth sub-class, *Dipnoi*.